

## **INTRODUCTION**

This report was prepared by the Office of Vital Statistics (OVS) and the Central Tumor Registry (MCTR) of the Montana Department of Public Health and Human Services (DPHHS). It provides a reference to some of the more frequently used vital statistics for Montana. Because it is intended primarily for reference, there is limited analysis and interpretation of the data. Additional tabulations are available on our website: [http://www.dphhs.state.mt.us/divisions/otd/vital/statistical\\_tables.htm](http://www.dphhs.state.mt.us/divisions/otd/vital/statistical_tables.htm). More detailed tabulations and analyses are available on request, as time and other resources permit.

A general discussion of the findings, with descriptive figures, appears on pages 17 through 71. The vital statistics tables for 1999 appear on pages 99-1 through 99-67. Where space permits, data for one or more prior years are provided for comparison. Tables 1, 3, 4, 24, and 25 provide frequencies and statistics on key vital events. Table 2 shows Montana's estimated resident population by county. Tables 5 through 8 present data on natality (births). Mortality (death) data are presented in Tables 9 through 13. Tables 14 through 17 provide data on induced abortions. Marriages are covered in Tables 18 through 23. Table 26 contains a county-level summary of reportable diseases. Tables 27 through 29 provide information on the incidence of cancer.

Records collected by the OVS provide the majority of data for these statistics and tabulations. These records include certificates of birth, death, and fetal death; transcripts of information on marriage, marital termination, and legally induced abortions; and reports of cancer cases. Any other source of data--such as the U.S. Bureau of the Census, the Montana Central Tumor Registry, or the Communicable Disease Program of DPHHS--is cited in the text or table where the data are used.

## **VITAL REGISTRATION AND DATA COLLECTION**

Registration of births, deaths, and fetal deaths is a legal requirement. Birth certificates must be filed with the local registrar within ten days of the event. The attending physician, midwife, or parent must file the certificate in the county in which the birth occurred. The person responsible for filing death or fetal death certificates is the funeral director or other person in charge of disposition of the body. The certificate must be filed with the county's local registrar no later than ten days after the date the death is discovered. A fetal death certificate must be filed when the fetus weighed 350 grams or more or, if the weight is unknown, the period of gestation was determined to be 20 weeks or more.

Montana vital statistics law (MCA 50-15-101 through 50-15-710) defines "reportable events"--as distinguished from registered events--as marriage, marital termination, and diagnosis and/or treatment of a "reportable tumor." Before the tenth day of each month, the clerk of district court must report all marriages that have occurred, been dissolved, or been invalidated in the county during the preceding month.

Cancer has been a reportable disease in Montana for hospitals and radiation centers since the central tumor registry was formed in 1979, independent clinical laboratories since 1985, and since July 1997, Montana physicians not reporting to hospitals. These institutions and persons are responsible for reporting within six months of the initial treatment or diagnosis.

The Abortion Control Act (MCA 50-20-101 through 50-20-306) makes any induced abortion occurring in Montana a reportable event. Facilities performing induced abortions are responsible for reporting within 30 days.

The original certificates of birth, death, and fetal death, and reports of induced abortion, marriage, divorce, and cancer are forwarded to the Office of Vital Statistics. Birth, death and fetal death certificates are permanently filed with and maintained by the OVS. The office maintains electronic records of all events in Montana's Vital

Statistics System.

OVS staff checks all records and reports for accuracy and completeness and code them for data entry. Those data that are not received electronically are key-entered and maintained in electronic files. Vital records files contain the legal portions of the certificates and reports. Vital statistics files contain statistical information without identification of individuals.

The OVS designs vital certificate and report forms to meet all legal registration and reporting requirements and to provide statistical data to federal, state, and county government agencies. The following statistical data on these vital events are available for analysis:

### **NATALITY**

- ! Date, hour, and place of birth.
- ! Age, race, ancestry, education, and birthplace of the parents; place of residence and marital status of the mother.
- ! Pregnancy history, including number of prior pregnancies, date and results of last prior pregnancy; date of last normal menses; month in which prenatal care began; number of prenatal visits; maternal risk factors during the pregnancy    medical conditions, tobacco and alcohol use, and weight gain.
- ! Birth process (including whether the mother was transferred to the hospital), obstetric procedures, complications of labor and delivery, method of delivery, and clinical estimate of gestation.
- ! Infant's sex, plurality, birth order, birthweight, and APGAR scores; the prophylactic used in the infant's eyes; whether the infant was transferred to another hospital; and any abnormal conditions or congenital anomalies.

### **MORTALITY**

- ! Date, hour, and place of death.
- ! Decedent's age at death, sex, race, ancestry, education, marital status, birthplace, and place of residence.
- ! Underlying cause of death; whether an autopsy was performed and, if so, whether results were available when cause of death was determined; if death resulted from an external cause (accident, suicide, or homicide), the circumstances of the injury, including whether it was sustained at work. If death resulted from an injury at work, the industry in which the decedent was employed is recorded.

### **FETAL MORTALITY**

- ! Date, hour, and place of delivery.
- ! Age, race, ancestry, and education, of parents; place of residence and marital status of the mother.
- ! Cause of fetal death; the sex, weight, plurality, birth order, and any anomalies or abnormal conditions of the fetus.

- ! Significant conditions of the mother, including number of prior pregnancies, date and result of last prior pregnancy; date of last normal menses; month in which prenatal care began; number of prenatal visits; maternal risk factors during the pregnancy--medical conditions, tobacco and alcohol use, and weight gain; clinical estimate of gestation; obstetric procedures; complications of labor and delivery; method of delivery.

## **MARRIAGE**

- ! Date and place of license issuance; date and place of marriage.
- ! Age, race, education, birthplace, and residence of the bride and groom.
- ! Previous marital history, including number of prior marriages and reason for termination of the most recent prior marriage (death or divorce), if applicable.

## **MARITAL TERMINATION (data prior to 1998 only)**

- ! Date and place of decree; type of termination (dissolution or invalid marriage); legal grounds for invalid marriage; whether the marriage was terminated in tribal or district court.
- ! Age, race, education, birthplace, and residence of wife and husband.
- ! Number of this marriage; reason for termination of the most recent prior marriage for each party; date the couple last lived in the same household; length of marriage; and petitioner.
- ! Number of children born alive of this marriage; number of children under 18 years of age in the household; number of children whose custody was awarded to the wife, husband, both, or another party.

## **INDUCED ABORTION**

- ! Date and place of procedure.
- ! Age, ancestry, race, education, marital status, birth date, and county of residence of patient.
- ! Pregnancy history, including date of last normal menses, clinical estimate of gestation, and number and result of prior pregnancies.
- ! Primary procedure that terminated pregnancy, additional procedures used, and resulting complications.

## **REPORTABLE NEOPLASMS**

- ! Reportable neoplasms: (1) all malignant cancers (including in-situ) except basal- and squamous-cell carcinomas of the skin if diagnosed at a localized stage, unless the primary site is of the eyelid, lip, anus, male genital organs, or female genital organs; (2) all benign tumors of the brain, pineal gland, and pituitary gland; and (3) carcinoid tumors.
- ! Date and place of diagnosis and/or first treatment.
- ! Patient's race, sex, marital status, age at diagnosis, date and place of birth, and place of residence.

- ! Primary cancer site; laterality; any other primary tumors; method of confirmation; histology, grade, stage at diagnosis, size of tumor, and lymph node examination.
- ! Follow-up information including summary of therapies, patient status, tumor status, recurrence information, and cause of death, if applicable.

## **TECHNICAL OVERVIEW**

### **DATA SOURCES AND LIMITATIONS**

#### **DELAY IN REPORTING**

This report includes 1999 vital records and transcripts received before July 15, 2000. The number of records received after this latter date is small, and since the use of this "cut off" date is fairly consistent from year to year, the effect of omitted data on the trends and patterns discussed is likely to be minimal. Because reporting of cancer diagnosis and treatment is an ongoing process, there is no cut off date for such data.

#### **GEOGRAPHIC ALLOCATION**

Table titles or footnotes indicate whether Vital Statistics are shown by place of residence or place of occurrence. For example, if a resident of Florida is killed in an automobile accident in Montana, the death is counted as a Montana occurrence but is included in Florida's residence statistics. Births, deaths, and fetal deaths may be tabulated either way. For deaths, the place of residence is the usual state and county of residence of the decedent. For births, the place of residence of the child is the usual state and county of residence of the mother. Place of residence, when reported for fetal deaths, is that of the mother.

Residence data for births, deaths, and fetal deaths occurring out-of-state are available because of a cooperative, interstate transcript-exchange agreement. All other states and the provinces of Canada participate in this agreement under the auspices of the National Association for Public Health Statistics and Information Systems. Interstate data on induced abortions are not available for all states, so all tabulations of abortion data except those in Table 25 are by Montana occurrence. The resident abortion statistics in Table 25 are incomplete because only in-state occurrences to Montana residents are tabulated.

Reports of cancer diagnoses and treatment are received from 24 other states. While incidence data in Table 29 are listed by the patient's county of residence, the data are incomplete and their use to calculate population-based rates (i.e. incidence as a proportion of resident population) is potentially misleading. Such statistics must be interpreted with caution.

While we can determine most of the nonresidents marrying in Montana, we do not know how many Montana residents marry outside of the state, nor do we know of residency changes associated with marital terminations. No exchange agreement is in effect for marriages or marital terminations, and tabulations are thus only by Montana occurrence. Data on marital terminations are limited to Montana decrees involving at least one Montana resident and are tabulated as occurrences by the Montana county in which the decree was issued.

## CAUSE OF DEATH CERTIFICATION

The medical certification section of the Montana Death Certificate asks for information on the causal and chronological sequence of events leading to death. The attending physician or coroner completes this section of the death certificate. It consists of two parts. Part I is used for reporting the conditions leading directly to death and, for each, the interval between onset of the conditions and death. Part II is for reporting any important diseases or conditions that influenced the course of the illness or trauma unfavorably, thus contributing to the fatal outcome, but that were not related to the immediate cause of death. For example, a medical certification might read as follows:

Part I. Death was caused by:				
<u>Duration</u>				
	Immediate cause	Due to	(a) <i>postoperative bronchial pneumonia</i>	<i>3 days</i>
		Due to	(b) <i>lobectomy</i>	<i>1 week</i>
	Underlying cause	Due to	(c) <i>primary cancer of lung</i>	<i>1 year</i>
Part II. Other significant conditions				
<i>Hypertensive cardiovascular disease</i>				

The causes of death in this report represent the underlying causes derived from the information provided on Parts I and II. In the above example, the underlying cause would be lung cancer. Each condition or cause reported on death certificates is classified according to the International Statistical Classification of Diseases, Injuries, and Related Health Problems, Tenth Revision, World Health Organization, Geneva, 1992 (ICD-10). The nosologist, the person responsible for coding cause of death, develops an underlying cause using ICD-10 codes and coding procedures developed for nationwide use by the National Center for Health Statistics (NCHS), one of the Centers for Disease Control and Prevention (CDC), Public Health Services, U.S. Department of Health and Human Services. The ICD-10 code for the death in the illustration above would be C34.9, "malignant neoplasm of bronchus or lung, area or lobe unspecified."

When the underlying cause is a traumatic injury, poisoning, or other adverse effects, this report tabulates deaths according to the nature of the event that led to fatal injury, poisoning, or adverse effect rather than the nature of the event's consequences.

Whenever possible, deaths are classified by the underlying cause reported. Exceptions occur when the underlying cause is not apparent from the certificate and clarification is not available. In these instances, the probable underlying cause is determined using a system of rules developed by NCHS.

## MARRIAGE AND MARITAL TERMINATION

Reliance on national marriage and marital termination statistics is limited by differences in data collection and data availability at or below the state level. Marriage, marital termination and residency are defined by the laws of each state. The minimum age for marriage, marriage license requirements, residency requirements for marital termination, acceptable grounds for such termination, and minimum period between marriage and marital termination vary from state to state. These differences can affect the comparability of data from state to state.

Data aggregation is also affected by how data are collected and reported. For most states, including Montana, frequency of marriage is based on marriages performed. For New Mexico, New York City, and some counties of Arizona, data represent licenses issued.

## **POPULATION ESTIMATES**

All crude rates per 1,000 or per 100,000 population in this report are based on population data provided by the U. S. Bureau of the Census (Census Bureau). For inter-censal years (all years not ending with 0"), the Census Bureau uses the Tax Return method (formerly, the Administrative Records Method) to arrive at population "estimates." These estimates refer to the resident population on July 1st of the year indicated. Population data for census years are known as "enumerations," and refer to the resident population on April 15th of the year indicated.

## **RACE**

Tabulation of vital events by race is imprecise for several reasons. First, it is difficult to identify a single or predominant race when persons are of mixed ancestry, as is the case for many U.S. citizens. A second difficulty with tabulations by race is that the category assignment is based on the opinion of the informant. As such, it may not reflect the same definitions of racial groups from one record to the next.

For births and fetal deaths, the race of the infant or fetus is defined as the reported race of the mother. This is the NCHS definition of infant or fetal race and is used so Montana statistics may be compared to U.S. regional and national statistics.

There are two other areas where racial classifications may lack precision: the "Hispanic" ancestry designation and the grouping of responses into an "Other" category. Hispanic ancestry is reported separately from race. Thus, it may apply to any racial category including "White" and "Native American." The proportion of persons in Montana reported as being of Hispanic ancestry is so small, however, that creating racial categories based on combined racial and Hispanic classifications is unlikely to yield any useful information.

The "Other" category is made up of all individuals not classified in the identified group(s) shown in the table. Those for whom race is not reported are therefore included as "Other." According to the 1990 Census, more than 90% of Montana's population at the time was white. Thus, classifying persons of unknown race as "Other" could introduce an unknown, probably slight, bias into statistics calculated from the data in these tables.

## **MARITAL STATUS**

Mother's marital status is designated "Married" on the birth record if the mother is shown on the birth certificate as married "at birth, conception or any time in between." "Unmarried" indicates that the mother was not married at any time during the pregnancy.

Marital status for death and abortion records is "Married or Separated," "Divorced," "Widowed," or "Single" as described by the informant. The "Divorced" designation on such records includes both marital dissolutions (formerly called divorces) and invalid marriages (formerly called annulments).

## **LIMITATIONS OF SMALL NUMBERS**

The occurrence of vital events is subject to chance variation. For example, a birth at 11:59 P.M. on December 31 would be counted in one year. If the infant had been born two minutes later at 12:01 A.M., the birth would be counted in the following year. This phenomenon is not of great importance for states or counties with substantial populations, since the relative number of births is not greatly affected by one event. However, for Montana counties, with their relatively small populations, the occurrence of an event in one year rather than the next could change the pattern of events and might, for example, lead to mistaken conclusions about trends in the county's birth rate.

When the number of events is displayed, the occurrence of small numbers is obvious. When rates or percentages are based on small numbers of events, that fact may not be immediately apparent. Rates or trends based on small numbers, less than 100, must be interpreted with caution. Meaningful conclusions cannot be drawn based on frequencies of less than five. This report provides the frequency and rate in all tables where rates based on small numbers of events may appear.

Similarly, percentages based on small totals can be misleading. For example, if there were ten births in a county and three of the new mothers were 18 or 19, the distribution of births by mother's age would show that 30% of the county's births were to teenagers. While accurate, this statistic is probably not useful for making policy.

Tabulating occurrences of an event over a period of several years may reduce the impact of chance variability in rates or percentages based on small numbers. An example is the five-year infant mortality rate shown in Table 11 or the five-year "rolling" rates displayed in Figure 16. However, the OVS has limited the use of multi-year rates in this report because such rates can conceal changes in trends that take place during the multi-year period.

## **DATA TABULATION AND PRESENTATION**

### **GEOGRAPHIC TABULATION**

The birth, death, fetal death, and induced abortion data are tabulated for Montana residents by place of residence and for all vital events occurring in Montana by place of occurrence. All occurrence statistics include events that occurred in Montana to residents of other states. Births, deaths, and fetal deaths that occurred out-of-state to Montana residents are included under resident statistics. Resident statistics on induced abortions include only in-state occurrences.

### **CAUSE OF DEATH AND CONVERSION TO ICD-10**

Periodically, the system used for the classification of diseases and causes of death is revised. Beginning with mortality data for 1999, OVS is now reporting underlying cause of death information captured and categorized by ICD-10.

The discussion and tables in this report refer to the underlying cause-of-death, grouped into named diseases and conditions. These are groupings that NCHS and most public health professionals use. In many cases, the ICD-10 and ICD-9 codes are listed in the table along with the condition or disease name; however, some tables show only the name.

**Figure 1** shows how ICD-10 codes are grouped into cause-of-death conditions and diseases for many of the causes of death tabulated and discussed in this report, as well categories frequently reported as "leading" causes of death. Corresponding ICD-9 codes are shown, as well as preliminary "comparability ratios" computed by NCHS.

Each new version of the ICD code introduces new categories, titles, groupings of disease, and coding rules in an effort to keep pace with the needs of medical and public health research. However, each new version introduces problems with the comparability of mortality data classified with different versions of the code. Past revisions of ICD have revealed discontinuities in statistical trends that can be attributed to changes in coding and classification procedures alone.

NCHS attempts to quantify the effects of ICD revisions through double coding of death records (i.e. coding underlying cause of death on each record using both the old and new versions of ICD) and comparing the frequencies produced by the two coding schemes. For each category of interest, a ratio of the number of deaths

classified in the latest version to that classified in the previous version is calculated. Such “comparability ratios” provide estimates of the change attributed to the revision alone and help distinguish “coding changes,” (i.e. changes in the underlying forces of mortality in the population). The comparability ratios shown in **Figure 1** represent preliminary results from a very large non-random sample of death records (more than half a million) from 14 states. These ratios are presented in order to indicate the approximate order of magnitude of expected changes in coding for underlying cause of death—they should not be expected to apply precisely to Montana’s death experience in 1999 or that of any other particular geographic location in any other year.

For example, the comparability ratio for “nephritis, nephrotic syndrome, and nephrosis”, 1.40, indicates we can expect to see a roughly forty percent increase in the number of deaths due to this cause solely because of the change from ICD-9 to ICD-10. The comparability ratio for pneumonia and influenza, 0.37, indicates that the observed number of deaths due to that cause will be reduced by almost two-thirds because of the coding change. Such effects must be taken into account when interpreting trends in mortality if one is to isolate the underlying forces of mortality that public health programs seek to affect.

Among other notable changes is the elimination of the ICD-9 category “chronic obstructive pulmonary diseases” (COPD), which has been replaced by the ICD-10 category “chronic lower respiratory diseases” (CLRD). The categories differ in that CLRD does not contain those causes of death in ICD-9 rubric 495. These causes include “extrinsic allergic alveolitis,” i.e. allergic alveolitis and pneumonitis due to inhaled organic dust.

Also, ICD-10 removes “misadventures to patients in surgical or medical care” (ICD-9: 870 - 876), “surgical and medical procedures causing reaction,” (ICD-9: 878 - 879), and “drugs causing adverse effects in therapeutic use” (ICD-9: 930 - 949) from the “accidents” category and places them in a new category called “complications of

The ICD-9 category “homicide and legal intervention,” which was reportable as a leading cause of death, was replaced by “assault” which no longer contains “legal intervention” (ICD-9: 970 - 978) but still contains “homicide” (ICD-9: 960 - 969).



Figure 1

**CLASSIFICATION (ICD-10 AND ICD-9) CODES FOR UNDERLYING CAUSES OF DEATH**

Underlying Cause of Death	ICD-10 Code (s)	ICD-9 Code (s)	Comparability Ratio
Tuberculosis	A16 - A19	010 - 018, 137	NA
Septicemia	A40 - A41	038	1.27
Human Immunodeficiency Virus (HIV) Infection	B20 - B24	042 - 044	1.05
Malignant Neoplasms (Cancer)	C00 -C97	140 - 208	1.00
Diabetes Mellitus (Diabetes)	E10 - E14	250	1.03
Alzheimer's Disease	G30	331.0	1.69
Diseases of Heart	I00 - I09, I11, I13, I20 - I51	390 - 398, 402, 404, 410 - 429	1.02
Cerebrovascular Disease	I60 - I69	430 - 434, 436 - 438	1.04
Atherosclerosis	I70	440	0.98
Pneumonia and Influenza	J10 - J18	480 - 487	0.37
Chronic Obstructive Pulmonary Diseases	N/A	490 - 496	N/A
Chronic Lower Respiratory Diseases	J40 - J47	490 - 494, 496	1.03
Appendicitis	K35 - K38	540 - 543	NA
Chronic Liver Disease and Cirrhosis	K70, K73 - K74	571	1.03
Nephritis, Nephrotic Syndrome, and Nephrosis	N00 - N07, N17 - N19, N25 - N27	580 - 589	1.40
Certain Conditions Originating in the Perinatal Period	P00 - P96	760 - 771.2, 771.4 - 779	1.03
Congenital Malformations, Deformations, and Chromosomal Anomalies	Q00 - Q99	740 - 759	0.87
Sudden Infant Death Syndrome (SIDS)	R95	798.0	0.99
Accidents	V01 - X59, Y85 - Y86	E800 - E869, E880 - E929	1.00
Motor Vehicle Accidents	V02 - V04, V09.0, V09.2, V12 - V14, V19.0 - V19.2, V19.4 - V19.6, V20 - V79, V80.3 - V80.5, V81.0 - V81.1, V82.0 - V82.1, V83 - V86, V87.0 - V87.8, V88.0 - V88.8, V89.0, V89.2	E810 - E825	NA
Non-Motor Vehicle Accidents	V01, V05 - V08, V09.1, V09.3 - V11, V15 - V18, V19.3, V19.7 - V19.9, V80.1 - V80.2, V80.6 - V80.9, V81.2 - V81.9, V82.2 - V82.9, V87.9, V88.9, V89.3 - X59.9, Y85 - Y86	E800 - E807, E826 -E929	NA
Intentional Self-Harm (Suicide)	X60 - X84, Y87.0	E950 - E959	1.0
Assault (Homicide)	X85 - Y09, Y87.1	E960 - E969	1.0
Complications of Medical and Surgical Care	Y40 - Y84, Y88	E870 - E879, E930 - E949	NA

NA Not available.

N/A The category, chronic obstructive pulmonary diseases, is not used in ICD-10 and is therefore not applicable.

## USE OF RATES AND RATIOS

It is sometimes quite useful, to adjust a rate or ratio for factors in the population that may affect the measurement. For instance, mortality rates, expressed as numbers of deaths per 1,000 or 100,000 resident population, can be adjusted to account for the effects of demographic factors that might affect mortality, such as race or age composition of the population. Where such adjustments have been made in this report, that fact is indicated in the title of the table or graph.

However, most reference tables in this report present rates and ratios that have not been adjusted to account for such factors. In such "crude" rates, the denominator is the estimated state or county population, divided by 1,000 or 100,000, and the numerator is the number of events, not weighted by any factor to adjust for the composition of the population. Examples of crude rates are given in the DEFINITIONS section below.

## DEFINITIONS

This section provides definitions of selected demographic, statistical, and medical terms as they are used in this publication. The terms are listed in alphabetical order. Cause of death, race, marital status, and population estimates, discussed elsewhere in the TECHNICAL OVERVIEW SECTION, are not included here.

**ABORTION** - the spontaneous or induced termination of a pregnancy, without live birth.

**ABORTION RATIO** - the number of induced abortions reported to the OVS, compared to the number of live births. It is calculated as follows:

$$\text{Abortion ratio} = \frac{\text{Number of induced abortions}}{\text{Number of live births}} \times 1,000$$

**AGE** - the calculated or reported age of the person(s) involved in a vital or reportable event. For fetal deaths, parents' reported ages were used. For births, induced abortions, marriages, divorces, and reportable cancers, age was calculated based on reported date of birth and date of the event. For deaths, age was calculated as the number of days between birth and death dates. Age in days was divided by 365.25 and truncated to yield age in years if the decedent was one year old or older. Where the record of the month and day of birth were incomplete or invalid, the month was assumed to be June and the day was assumed to be the 15th for the calculation of age in years.

**AGE-ADJUSTED DEATH RATE** - an index number that represents the crude death rate that would occur if the observed age-specific death rates were present in a population with an age distribution identical to that of a standard population. It is derived from several age-specific death rates and used to compare relative mortality risks from one group to another (including comparisons of the resident populations of a single geographic region at different times). Statistically, it is a weighted average of the age-specific rates, with the weights representing the proportionate distribution of age in a hypothetical population. It is possible to adjust death rates for other demographic variables that might influence mortality, such as race, sex, or ancestry. (See AGE-SPECIFIC DEATH RATE below and AGE-ADJUSTED DEATH RATES in the MORTALITY section of the report for more discussion.) It is calculated in this report by the direct method, using the 2000 U.S. population as the standard population, as follows:

$$\text{Age - adjusted death rate} = \sum_{i=1}^{11} S_i w_i$$

where  $S_i$  = the age - specific death rate for the  $i^{\text{th}}$  age group

where  $w_i$  = the weight of the  $i^{\text{th}}$  age group in the standard population

**AGE-SPECIFIC DEATH RATE** – the proportion of deaths in a specific age group, expressed as a number per thousand persons in that age group. The “standard 11” age groups are typically used: 0 years of age, 1 – 4 years of age, 5 – 14, 15 – 24, ... , 75 – 84, and 85 years of age or older. It is calculated as follows:

$$\text{Age specific death rate} = \frac{\text{Number of deaths within the age group}}{\text{Midyear population of the age group}} \times 1,000$$

**APGAR SCORE** - an evaluation of a newborn infant’s physical status that assigns numerical values (0-2) to each of five criteria 1) heart rate, 2) respiratory effort, 3) muscle tone, 4) response stimulation, and 5) skin color; a score of eight to ten indicates the best possible condition.

**AT-RISK POPULATION** - all of the persons to whom a given event could occur. The at-risk or “subject” population is the denominator in a rate calculation. (See the use of “at risk” in the definition of FERTILITY RATE).

**BIRTH RATE** - the proportion of live births in the total population, expressed as a number per thousand persons in that population. Unless otherwise stated, the birth rate is the annual, crude rate, unadjusted for factors affecting the population. It is calculated as follows:

$$\text{Crude birth rate} = \frac{\text{Number of live births}}{\text{Midyear population}} \times 1,000$$

**COUNTY** - as used in table titles, either an incorporated county or that part of Yellowstone National Park which is located in Montana. For example, a tabulation of deaths “by county of occurrence” would show deaths in the Montana portion of Yellowstone National Park as “county” occurrences.

**DEATH RATE** - the proportion of deaths in the total population, expressed as a number per thousand population. Unless otherwise stated, the death rate is the annual crude rate, unadjusted for factors affecting the population. It is calculated as follows:

$$\text{Crude death rate} = \frac{\text{Number of deaths}}{\text{Midyear population}} \times 1,000$$

**EXTREMELY LOW BIRTHWEIGHT** - the birthweight of an infant of less than 1,000 grams (about 2 pounds 3.25 ounces).

**FERTILITY RATE** - the total number of live births as a proportion of the estimated female population at risk, expressed as a number per thousand women in that population. The population at risk of experiencing a birth is all fertile women. The approximation used is all women in the main childbearing ages (15 to 44 years). It is calculated as follows:

$$\text{Fertility rate} = \frac{\text{Number of live births}}{\text{Midyear population of women aged 15 – 44}} \times 1,000$$

**FETAL DEATH** - the reported birth of a fetus that shows no evidence of life after complete birth-that is, no action of the heart, breathing, or movement of voluntary muscles. Montana law requires report of fetal death if the fetus weighed 350 grams or more or, if the weight is unknown, the delivery took place after 20 weeks of gestation. There is no provision in Montana law for reporting the birth of a non-viable fetus with a lower weight.

**FETAL MORTALITY RATIO** - the number of fetal deaths as compared to the number of live births, expressed as a number per thousand live births. It is calculated as follows:

$$\text{Fetal mortality ratio} = \frac{\text{Number of fetal deaths}}{\text{Number of live births}} \times 1,000$$

**FREQUENCY** - the number of occurrences of an event or observation; how often an event occurs.

**ICD** - the International Classification of Diseases code used to classify and report causes of death in vital statistics. This code is revised periodically. The current revision is called the International Statistical Classification of Diseases, Injuries, and Related Health Problems, Tenth Revision, and is published by the World Health Organization. In this report, the code is referred to as ICD-10. (See the “Cause of Death Certification” and “Cause of Death and Conversion to ICD-10” sections of this report for further details).

**INCIDENCE RATE** - the number of new occurrences of an event within a population during a stated time period for a given number of persons in that population. The time period is assumed to be annual unless otherwise stated. The incidence rate for reportable diseases is expressed as the number of new cases per 100,000 population.

**INDUCED ABORTION** - a legal, medical or surgical procedure that is intended to terminate a pregnancy without live birth.

**INFANT** - an individual less than 365 days (one year) old.

**INFANT MORTALITY RATE** - the number of infant deaths compared to the number of live births in that same period, expressed as a number per thousand live births. It is calculated as follows:

$$\text{Infant mortality rate} = \frac{\text{Number of infant deaths}}{\text{Number of live births}} \times 1,000$$

**INVALID MARRIAGE** - a marriage deemed never to have been legal; a declaration of invalid marriage was formerly called an annulment.

**LIVE BIRTH** - the birth of a child who shows evidence of life after complete birth. Evidence of life includes heart action, breathing, or movement of voluntary muscles.

**LOW BIRTH WEIGHT** - the birth weight for a live-born infant of less than 2,500 grams (about five pounds, eight ounces).

**MARITAL DISSOLUTION** - legal termination of a valid marriage; a marital dissolution was formerly called a divorce.

**MATERNAL DEATH** - a woman's death attributable to childbirth or complications of pregnancy, delivery, and the puerperium.

**MATERNAL MORTALITY RATE** - the total number of maternal deaths as a proportion of total live births, expressed as a number per hundred thousand live births. It is calculated as follows:

$$\text{Maternal mortality rate} = \frac{\text{Number of maternal deaths}}{\text{Number of live births}} \times 100,000$$

**MEAN** - the arithmetic average, obtained by dividing the sum of individual values or scores by the number of values or scores observed. For example, the mean age for six persons aged 9, 10, 12, 13, 13, and 16 is 73 divided by 6, or 12.2 years.

**MEDIAN** - the midpoint; for our purposes, given a set with an odd number of values, the median is the middle value when arranged in numerical order. For a set with an even number of values, the median is the mean of the two "middle" values. For the example under the definition of MEAN, the median age is 12.5 years.

**MODE** - the most frequently observed value in a set of values. For the example under the definition of MEAN, the modal age is 13.

**NATURAL INCREASE** - the excess of births over deaths among residents of an area.

**NEONATAL DEATH** - a death occurring within the first 27 days of life.

**NEOPLASM** - a new, abnormal, malignant, or benign growth of tissue that is uncontrolled and progressive. Malignant neoplasms are commonly called cancers.

**OUT-OF-WEDLOCK BIRTH RATIO** - the number of births to unmarried women as compared to the number of live births, expressed as a number per thousand live births. It is calculated as follows:

$$\text{Out - of - wedlock birth ratio} = \frac{\text{Number of live out - of - wedlock births}}{\text{Number of livebirths}} \times 1,000$$

**PARITY** - the condition of a woman with respect to her having borne viable offspring. The parity of this birth is the number of live children the woman has borne, including those born in the current delivery.

**PERCENTILE** - (as in xxth percentile) a statistic used to further describe the dispersion of a set of values. One-quarter of the values in a set are less than or equal to the value of the 25th percentile; one-half are less than or equal to the 50th percentile (or median); etc. The 25th and 75th percentiles are found by counting out to the first quarter and three quarter of the values, respectively. When this count lands between two values in the list, averages can be taken, although any number between the two would suffice. For the example under the definition of MEAN, the 25th percentile is 11 and the 75<sup>th</sup> percentile is 13.

**PERINATAL DEATH** - a death occurring near the time of birth. The number of perinatal deaths is the sum of registered fetal deaths and neonatal deaths.

**PERINATAL MORTALITY RATE** - the number of fetal deaths plus neonatal deaths as compared to the number of deliveries (fetal deaths plus live births), expressed as a number per thousand persons in that population. It is calculated as follows:

$$\text{Perinatal mortality rate} = \frac{\text{Number of fetal deaths} + \text{neonatal deaths}}{\text{Number of fetal deaths} + \text{livebirths}} \times 1,000$$

**PLACE OF OCCURRENCE** - the location where an event took place, regardless of the usual residence of the person(s) involved.

**PLACE OF RESIDENCE** - the usual residence of the person(s) involved in a vital event, regardless of the event's place of occurrence. For births and fetal deaths, the mother's usual place of residence. For induced abortions, the usual place of residence of the patient. For deaths, the usual place of residence of the decedent.

**PLURALITY** - the number of infants born during this delivery.

**POST-NEONATAL DEATH** - during the first year of life, but after the first 27 days.

**PUERPERIUM** - the condition of the mother immediately following childbirth.

**RATE** - the frequency of an event in a population subject to that event, expressed as the frequency of occurrence per unit--generally 1,000 or 100,000--of the subject population. For example, the Montana resident birth rate per 1,000 population is the number of births to Montana resident women for every 1,000 men, women, and children in the Montana population.

**RATIO** - the comparison of two types of events occurring in a subject population, expressed as a frequency of occurrence per unit of one of the events. For instance, the Montana fetal mortality ratio is the number of fetal deaths per 1,000 live births to Montana resident women. The population, fertile women residing in Montana, is the same for both events, but the events are unlikely to have happened to the same women. Also, the total number of fertile women is not part of the calculation; the basis for the unit (the denominator) is live births, one of the events.

**STAGE AT DIAGNOSIS** -The extent to which a cancer has spread when it is first diagnosed. Summary stages for cancer diagnoses are:

**In-Situ** - An abnormal cell growth that meets the criteria for malignancy but does not invade the basement membrane of the organ involved.

**Local** - A cancer that is limited to the site of origin. It has not spread beyond the organ.

**Regional** - A cancer that extends to adjacent organs and/or regional lymph nodes, and appears to have spread no further.

**Distant** - A cancer that extends beyond adjacent organs and has spread to a distant site or distant lymph node.

**Unknown** - A cancer for which there is insufficient information available to determine the stage at diagnosis.

**STANDARD DEVIATION** - a measure of how “spread out” a set of values is, on average, from its mean. A small standard deviation indicates that, on average, the values are tightly grouped around the mean while a large standard deviation indicates that, on average, the values are scattered widely. For the series of values presented for the definition of MEAN, the standard deviation is 2.27. For a set of N values, it is computed as follows:

$$\text{Standard deviation} = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \mathbf{m})^2}$$

where  $\mathbf{m}$  = the mean of the set of N values

where  $x_i$  = the  $i^{\text{th}}$  value in the set of N values

**SUBJECT POPULATION** - see AT-RISK POPULATION.

**SURVIVAL RATE** - the percentage of people diagnosed with a life-threatening disease and remaining alive as of a stated time period after diagnosis.

**THERAPIES** - procedures used to treat cancer or other health conditions. The following are therapies for reportable cancers:

**Biological Response Modifiers (BRM) Therapy** - administration of a chemical that alters the patient's immune system to destroy cancer growth.

**Chemotherapy** - administration of a drug to destroy cancer cells.

**Hormone Therapy** - administration of a hormone or steroid drug that destroys cancer by changing the hormone balance of the patient.

**Radiation** - the transmission of light, short radio waves, ultraviolet light, or x-rays to destroy cancer cells. Radiation may reduce the size, destroy the cancer, or stop growth of the cancer.

**Surgery** - a partial or total removal of a primary cancer or a metastatic cancer.

**VERY LOW BIRTHWEIGHT** - the birthweight of an infant of less than 1,500 grams (about 3 pounds 5 ounces).

**YEARS OF POTENTIAL LIFE LOST (YPLL)** - A measure of the cost of premature deaths that emphasizes deaths of the young by measuring the number of years lost to death before a given age, 75 years in this report. Statistically, YPLL is the difference between a given age and the decedent's age at death, summed for all decedents younger than the given age.